



## RADIO TEST REPORT

Test Report No.: 29EE0038-YK-01-B-R1

Applicant : PIONEER CORPORATION  
Type of Equipment : Bluetooth Adapter  
Model No. : AS-BT100  
FCC ID : AJDT106  
Test regulation : FCC Part15 Subpart C: 2010  
Test result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
6. This report is a revised version of 29EE0038-YK-01-B. 29EE0038-YK-01-B is replaced with this report.

Date of test: December 16, 17, 25 and 26, 2008

Representative  
test engineer:

Tatsuya Arai  
Engineer of WiSE Japan,  
UL Verification Service

Approved by :

Toyokazu Imamura  
Manager of WiSE Japan,  
UL Verification Service

UL Japan, Inc.

Yamakita EMC Lab.

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

MF058b (12.01.11)

## **Contents**

### **Page**

<b>SECTION 1: Customer information.....</b>	<b>3</b>
<b>SECTION 2: Equipment under test (E.U.T.).....</b>	<b>3</b>
<b>SECTION 3: Test specification, procedures &amp; results.....</b>	<b>4</b>
<b>SECTION 4: Operation of E.U.T. during testing .....</b>	<b>6</b>
<b>SECTION 5: Conducted emission.....</b>	<b>8</b>
<b>SECTION 6: Carrier frequency separation.....</b>	<b>8</b>
<b>SECTION 7: 20dB bandwidth &amp; Occupied bandwidth (99%) .....</b>	<b>8</b>
<b>SECTION 8: Number of hopping frequency.....</b>	<b>9</b>
<b>SECTION 9: Dwell time.....</b>	<b>9</b>
<b>SECTION 10: Maximum peak output power .....</b>	<b>9</b>
<b>SECTION 11: Out of band emissions (Antenna port conducted).....</b>	<b>9</b>
<b>SECTION 12: Radiated emission .....</b>	<b>10</b>
<b>Contents of appendixes.....</b>	<b>11</b>
<b>APPENDIX 1: Photographs of test setup .....</b>	<b>12</b>
<b>APPENDIX 2: Test data.....</b>	<b>15</b>
<b>APPENDIX 3: Test instruments.....</b>	<b>89</b>

---

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## **SECTION 1: Customer information**

Company Name : PIONEER CORPORATION  
Address : 1-1 Shin-Ogura, Saiwai-ku, Kawasaki-shi, Kanagawa 212-0031 JAPAN  
Telephone Number : +81 44 580 4425  
Facsimile Number : +81 44 580 4017  
Contact Person : Tatsuo Ohnobi

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : Bluetooth Adapter  
Model Number : AS-BT100  
Serial Number : HCI119  
Rating : DC5V  
Country of Mass-production : Malaysia  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : December 6, 2008  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: AS-BT100 (referred to as the EUT in this report) is a Bluetooth Adapter.

Similar model of the EUT and the difference:

	AS-BT100	AS-BT200
Sony Bluetooth Hybrid IC	CXN1600-2BDL	CXN1600-2CFL
Bluetooth version	Ver. 2.0 + EDR	Ver. 2.1 + EDR

\* The only difference between CXN1600-2BDL and CXN1600-2CFL are firmware.

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Clock frequency : 24MHz  
Bandwidth & channel spacing : 79MHz & 1MHz  
Type of modulation : FHSS (GFSK,  $\pi/4$ DQPSK, 8DPSK)  
Antenna model & type : AHD1103-244ST01(Chip)  
Antenna gain with cable loss : +1.15dBi  
Antenna connector type : U. FL (Hirose)  
ITU code : F1D, G1D  
Operation temperature range : +15 to +35 deg.C.

FCC Part15.31 (e)

Host device provides the Bluetooth Adapter with stable power supply (DC5V), and the power is not changed when voltage of the device is varied. Therefore, the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement

Bluetooth Adapter complies with the requirement. It is impossible for end users to replace the antenna, because the antenna is mounted inside of the transmitter.

---

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## **SECTION 3: Test specification, procedures & results**

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2010, final revised on December 6, 2010  
and effective January 5, 2011

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.209 Radiated emission limits, general requirements  
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,  
and 5725-5850MHz

The EUT complies with FCC Part 15 Subpart B: 2010. Refer to the test report 29EE0038-YK-01-C.

\*The revision on December 6, 2010 does not affect the test specification applied to the EUT.

### **3.2 Procedures & Results**

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section 15.207	-	N/A	29.4dB (0.2000MHz, N, QP, Tx 2441MHz, DH5 and 3DH5)	Complied
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A		Complied
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (d) Section15.209	Conducted/ Radiated	N/A	7.2dB (2400.00MHz, AV, Horizontal, Tx 2402MHz, DH5)	Complied

Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

### 3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators, RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted	-	Complied

Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.

\* Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

	No.1 open site (±)	No.2 open site (±)	No.1 anechoic chamber (±)
<b>Conducted emission</b>			
150kHz-30MHz	2.7 dB	2.7 dB	2.8 dB
<b>Radiated emission (3m)</b>			
30-300MHz	4.3 dB	4.3 dB	4.6 dB
300-1000MHz	4.3 dB	4.3 dB	4.5 dB
1GHz<	5.7 dB	5.8 dB	5.7 dB

<b>Antenna port conducted test</b>	(±)
Below 1GHz	0.4dB
1GHz and above	0.7dB

#### Conducted emission test

The data listed in this test report has enough margin, more than site margin.

#### Radiated emission test

The data listed in this test report has enough margin, more than site margin.

### 3.5 Test location

UL Japan, Inc. Yamakita EMC Lab.

907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN

Telephone number : +81 465 77 1011

Facsimile number : +81 465 77 2112

JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 open area test site	95486	2973B-1	-	12.0 x 41.2	30m
<input type="checkbox"/> No.2 open area test site	466226	2973B-3	-	9.5 x 17.8	10m
<input checked="" type="checkbox"/> No.1 Semi-anechoic chamber	95967	2973B-2	10.0 x 7.5 x 5.7	10.0 x 7.5	3m
<input type="checkbox"/> No.2 Full-anechoic chamber	-	-	8.0 x 4.7 x 4.0	8.0 x 4.7	2.5m
<input checked="" type="checkbox"/> No.1 shielded room	-	-	8.0 x 5.0 x 2.5	8.0 x 5.0	-
<input checked="" type="checkbox"/> No.2 shielded room	-	-	5.0 x 4.0 x 2.5	5.0 x 4.0	-
<input type="checkbox"/> No.3 shielded room	-	-	4.0 x 5.0 x 2.7	4.0 x 5.0	-
<input type="checkbox"/> No.4 shielded room	-	-	5.0 x 4.0 x 2.7	5.0 x 4.0	-
<input type="checkbox"/> No.5 shielded room	-	-	4.5 x 4.3 x 2.7	4.5 x 4.3	-

### 3.6 Test setup, Data of test & Test instruments

Refer to Appendix 1 to 3.

#### **UL Japan, Inc.**

#### **Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## SECTION 4: Operation of E.U.T. during testing

### 4.1 Operating mode

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test item	Operating mode	Tested frequency
Conducted emission	Transmitting (DH5/3DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Carrier frequency separation	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON) -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5 -Inquiry	-
Maximum peak output power	Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9 -DH5 -2DH5 -3DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON/Inquiry -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

\*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

\*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.  
However, the limit level 125mW of AFH mode was used for the test.

\*EUT has the power settings by the software as follows;

Power settings: BDR:Ext.=255,Int.=44

EDR:Ext.=255,Int.=48

Software: CSR BlueSuite BlueTest Version 1.24

CSR BlueSuite BtCliCtrl Version 1.24 (Inquiry mode only)

\*This setting of software is the worst case.

Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

**UL Japan, Inc.**

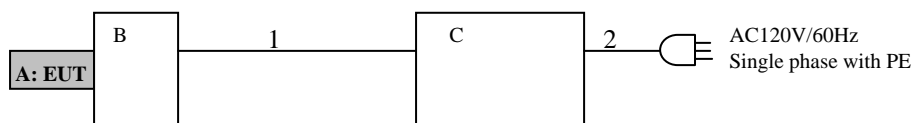
**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## 4.2 Configuration of tested system



\* Test data was taken under worse case conditions.

### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth Adaptor	AS-BT100	HCI119	PIONEER CORPORATION	-
B	Test jig	-	-	PIONEER CORPORATION	-
C	DC Power Supply	PAN35-10A	DE001677	Kikusui Electronics Corp.	-

The test was performed with the condition that the enclosure was removed, however, that did not affect the test results.

### List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Power cable	0.8 (Conducted Emission) 1.6 (Other test)	Unshielded	Unshielded	-
2	AC Power cable	3.0	Unshielded	Unshielded	-

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## **SECTION 5: Conducted emissions**

### **5.1 Operating environment**

The test was carried out in No.1 shielded room.

### **5.2 Test configuration**

EUT was placed on a wooden platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN) and excess AC cable was bundled in center. Photographs of the set up are shown in Appendix 1.

### **5.3 Test conditions**

Frequency range : 0.15 - 30MHz

### **5.4 Test procedure**

The host device, PC was connected to a LISN (AMN). An overview sweep with peak detection has been performed. The Conducted emission measurements were made with the following detector function of the test receiver.

Detector: QP/AV

IF Bandwidth: 9kHz

### **5.5 Results**

Summary of the test results : Pass

Refer to APPENDIX 2

## **SECTION 6: Carrier frequency separation**

### **Test procedure**

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 2

## **SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 2

---

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112



## **SECTION 8: Number of hopping frequency**

### **Test procedure**

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 9: Dwell time**

### **Test procedure**

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 10: Maximum peak output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 2

## **SECTION 11: Out of band emissions (Antenna port conducted)**

### **Test procedure**

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

Summary of the test results: Pass  
Refer to APPENDIX 2

---

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## **SECTION 12: Radiated emission**

### **12.1 Operating environment**

The test was carried out in No.1 Semi-Anechoic Chamber.

Temperature : See test data (APPENDIX 2)

Humidity : See test data (APPENDIX 2)

### **12.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. Photographs of the set up are shown in Appendix 1.

### **12.3 Test conditions**

Frequency range : 30MHz to 26.5GHz

Test distance : 3m

### **12.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz,
Bandwidth		AV RBW: 1MHz/VBW: 300Hz (See data) *1)
Measuring antenna	Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	Horn

\*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 14. With the position, the noise levels of all the frequencies were measured.

Combinations of the worst case

Antenna polarization	Worst position	
	Below 1GHz	Above 1GHz
Horizontal	Z	Y
Vertical	Z	Z

### **12.5 Band edge**

Band edge level at 2390MHz, 2400MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data.

### **12.6 Results**

Summary of the test results : Pass \*No noise was detected above the 5th order harmonics.

Refer to APPENDIX 2

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

## **Contents of appendixes**

### **APPENDIX 1: Photographs of test setup**

Conducted emission  
Radiated emission  
Pre-check of the worst position

### **APPENDIX 2: Test data**

Conducted emission  
Carrier frequency separation  
20dB bandwidth  
Number of hopping frequency  
Dwell time  
Maximum peak output power  
Spurious emission (Antenna port conducted)  
Radiated emission  
Duty cycle  
99% Occupied bandwidth

### **APPENDIX 3: Test instruments**

Test instruments

---

**UL Japan, Inc.**

**Yamakita EMC Lab.**

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112